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Building The Wireless Future™

January 26, 1995

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Mr. William F. Caton
Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: Ex Parte Presentation
CC Docket No. 94-54, RM-8012

DOCKET FILE COPY ORIGINAL

Dear Mr. Caton:

On Thursday, January 26, 1995, the Cellular Telecommunications Industry Association ("CTIA") represented by Mr. Michael Altschul, Vice President and General Counsel; Mr. Randall Coleman, Vice President, Regulatory Policy and Law; Ms. Andrea Williams, Staff Counsel; and Mr. Ronald F. Peters, Network Engineering Manager, ALLTEL Mobile Communications, Inc. met with the following Commission staff persons to discuss issues concerning equal access and interconnection:

Wireless Telecommunications Bureau

Mr. John Cimko, Chief, Policy Division,
Mr. Michael Wack, Deputy Chief, Policy Division
Ms. Judy Argentieri, Attorney, Policy Division
Ms. Amy Lesch, Analyst, Policy Division

Common Carrier Bureau

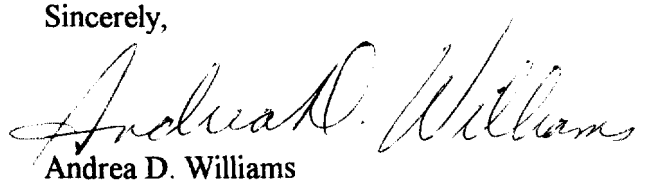
Mr. Patrick Donovan, Assistant Bureau Chief
Ms. Barbara S. Esbin, Assistant Chief, Tariff Division
Mr. Kalpak Gude, General Attorney, Tariff Division

At the meeting, CTIA also presented the attached documents titled, "Interconnection" and "Notes on the BOC Intra-LATA Networks - 1986".

No. of Copies rec'd 0+1
List A B C D E

Pursuant to Section 1.1206 of the Commission's Rules, an original and one copy of this letter and the attachments are being filed with your office. If you have any questions concerning this submission, please contact the undersigned.

Sincerely,



Andrea D. Williams
Staff Counsel

Attachments

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Interconnection

(CC Docket No. 94-54)

Ex Parte Presentation of
Cellular Telecommunications
Industry Association (CTIA)
January 26, 1995

CTIA  **Building The Wireless Future**™

Today's Theme: Current Local Exchange Carrier (LEC) interconnection requirements have worked well for cellular and are sufficient to permit new wireless services to compete and grow.

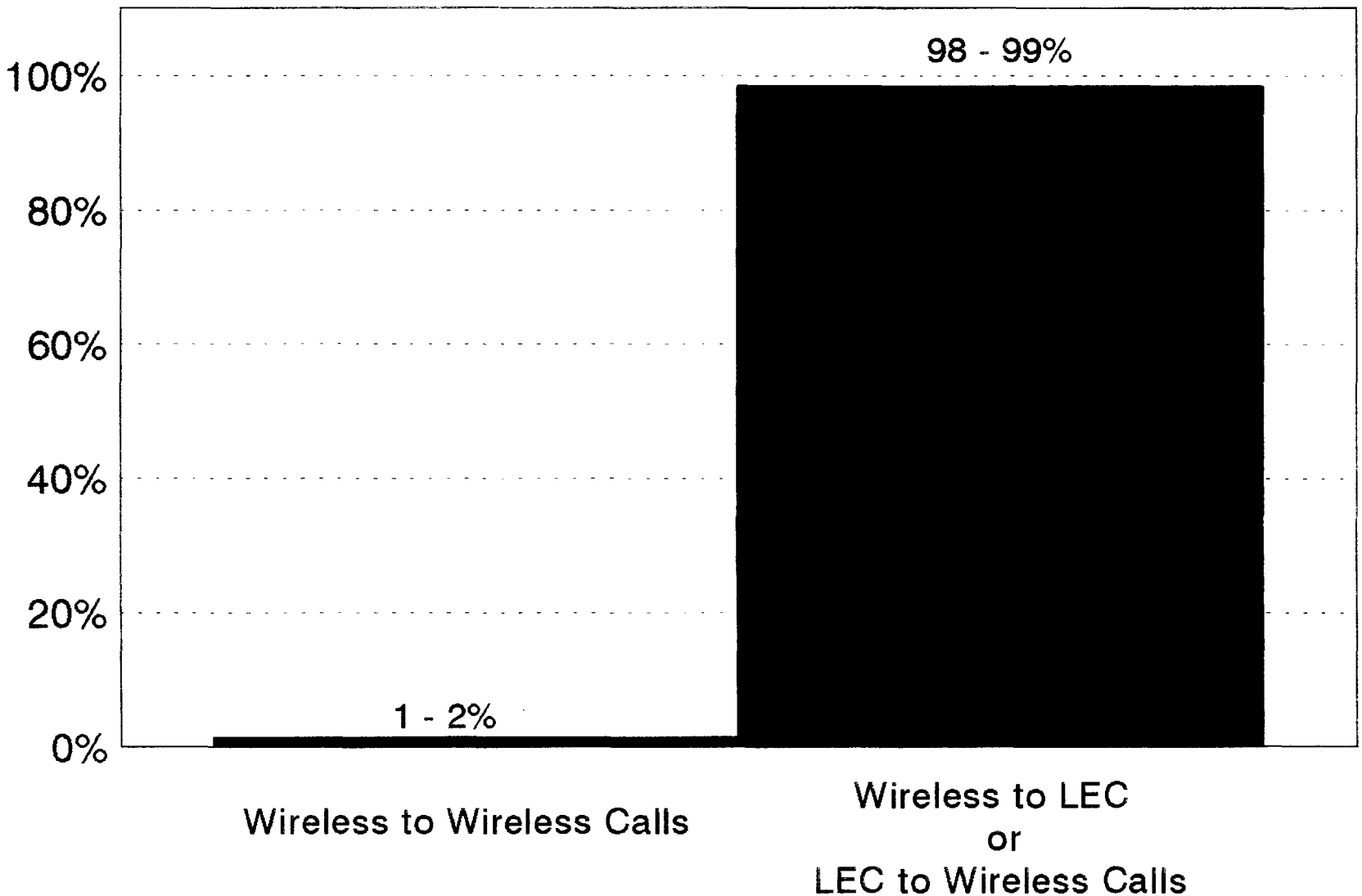
- **LEC Interconnection**
  - **Good faith negotiation works and is flexible.**
  - **Sellers and buyers are sophisticated.**
- **CMRS Interconnection**
  - **Interconnection through LEC achieves the goal of CMRS to CMRS interoperability.**
  - **Direct CMRS-to-CMRS links are inefficient today, and are not precluded by current requirements.**
  - **Players and level of sophistication are the same.**
- **Conclusion**
  - **No new interconnection requirements are necessary.**

Initial Concerns

- **Interoperability between wireless networks, i.e., the ability of customers on one wireless network to reach customers on any other wireless (or wired) network.**

- **Given the explosion in cellular subscribers, how much of their traffic is cellular to cellular, i.e., calls which are not connected through the LEC?**

WIRELESS CALLS -- ORIGINATION AND TERMINATION



Under Current LEC Interconnection Requirements

- **Few carriers have a business unless they provide their customers with interconnection, locally and long distance, to all other telephone customers.**

- **All carriers currently interconnect to the PSTN through LECs, with minor exceptions.**

- **Existing law requires all LECs to provide interconnection to all CMRS and long distance carriers on non-discriminatory terms.**

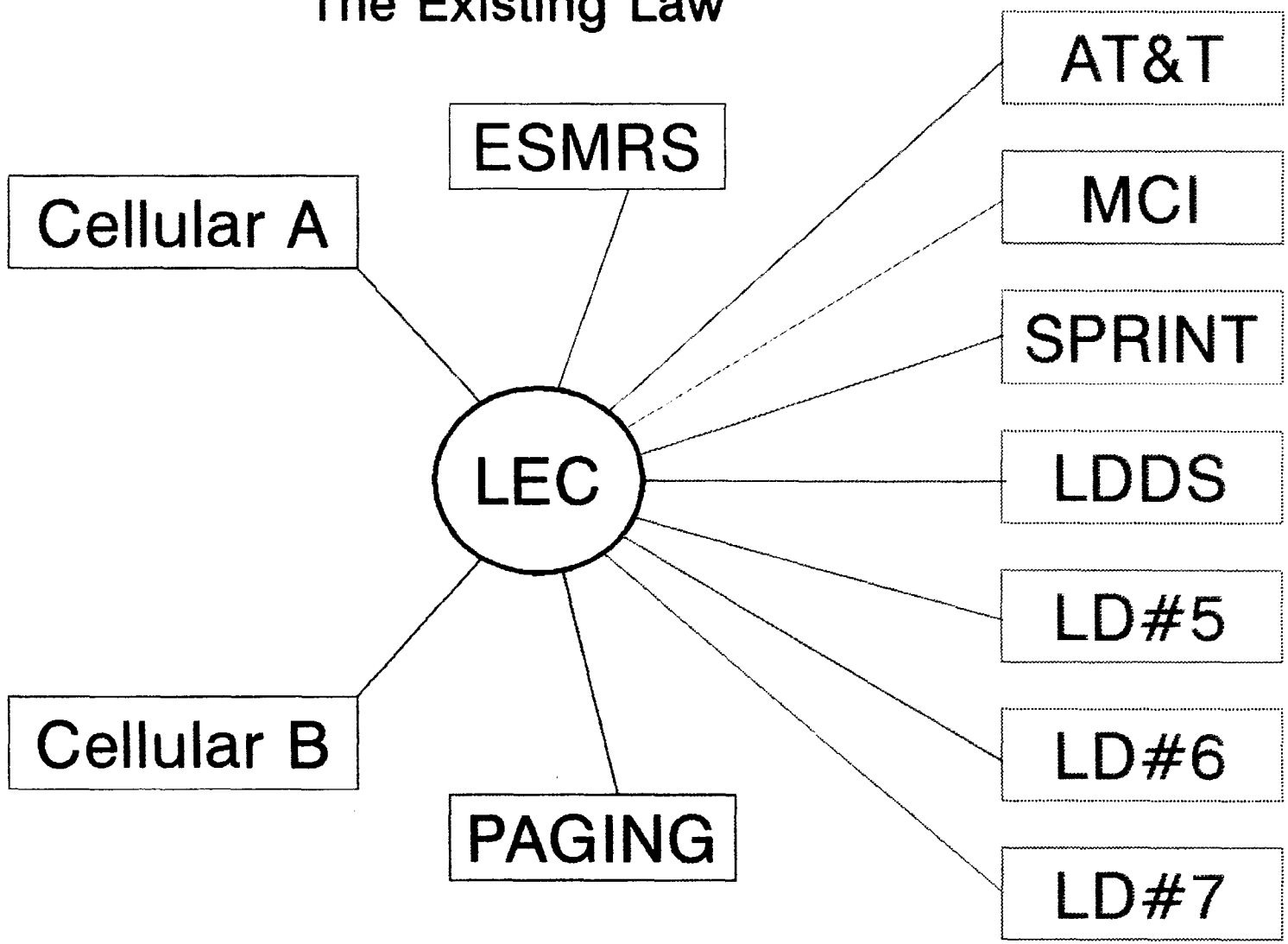
- **Today, LECs provide that interconnection to both local cellular carriers, to new ESMR competitors of cellular (*e.g.*, Nextel), and to paging companies.**

- **98-99% of current wireless traffic either originates or terminates with a LEC.**

- **The good faith negotiation of interconnection arrangements between LECs and CMRS providers works and tariffs do not.**

FULL CUSTOMER INTERCONNECTION TO ALL NETWORKS

The Existing Law

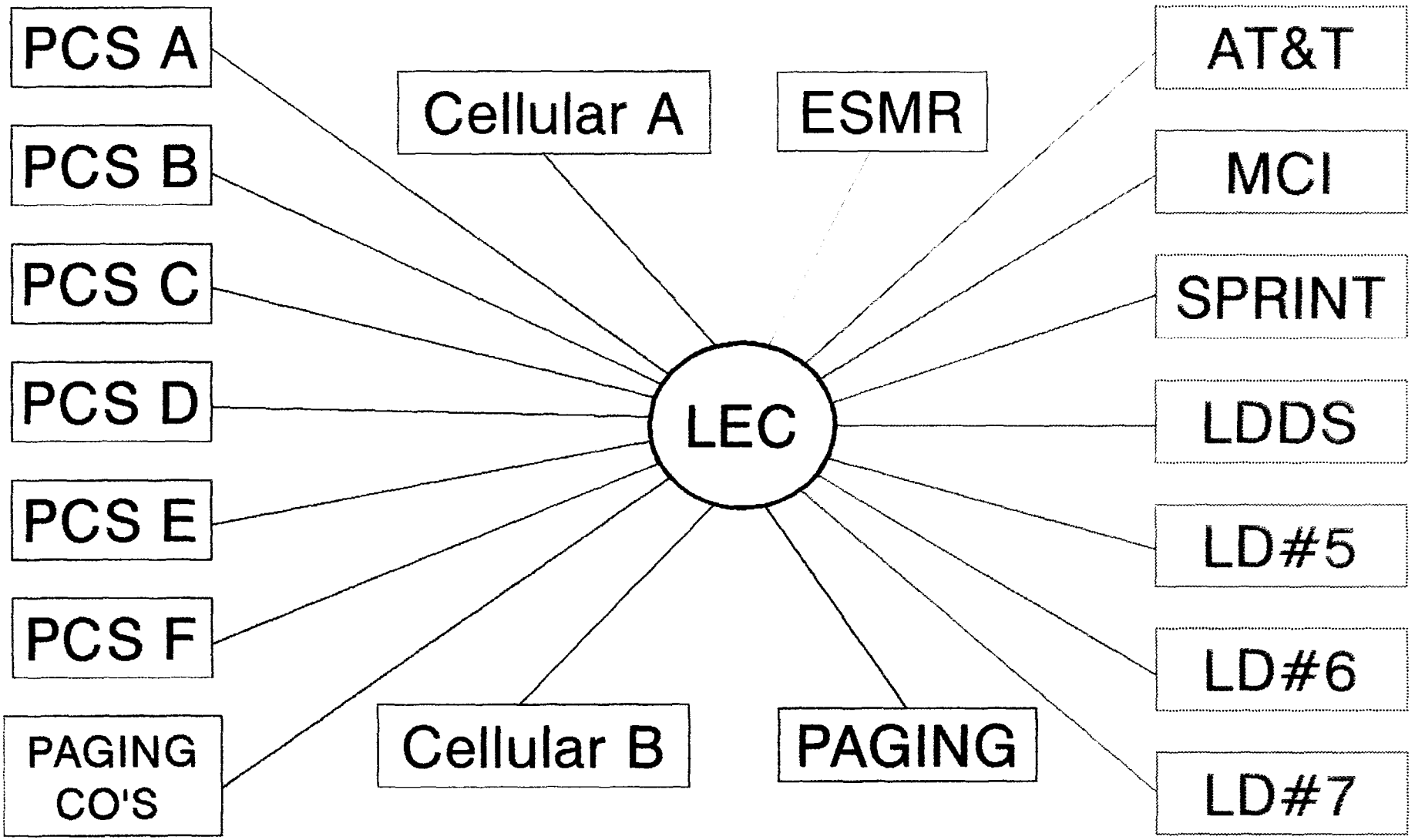


Effect on New Wireless Networks

- **What will happen to the new PCS networks? That is, will there be interoperability between wireless networks?**
- **Concern is expressed that some wireless carriers will be able to retard the development of others by denying interconnection.**
- **New wireless carriers will receive the same non-discriminatory interconnection rights to LECs that current wireless carriers have today.**
- **No change in current law or regulation is required -- interconnection through LEC achieves the goal of CMRS to CMRS interoperability.**
- **Like current wireless carriers, almost all of their traffic will originate or terminate through LECs -- so their direct relations with other CMRS carriers are irrelevant.**
- **Direct CMRS-to-CMRS links are inefficient today, and, should circumstances change, are not precluded by current requirements.**
- **Players and level of sophistication are the same.**

FULL CUSTOMER INTERCONNECTION TO NEW NETWORKS

The Existing Law

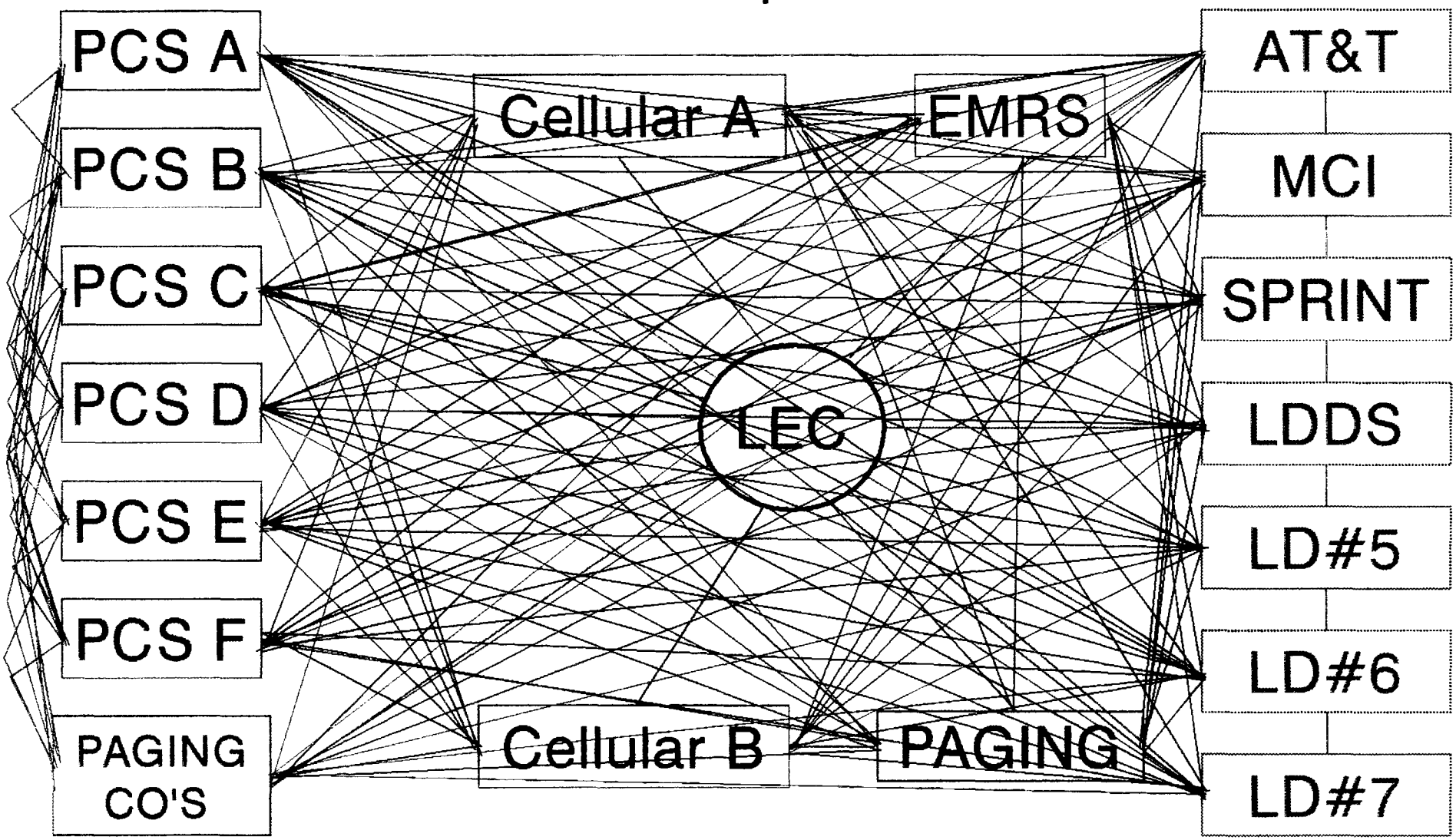


What Happens if the Law is Changed to Require Every Carrier to Interconnect to Every Other Carrier?

- As shown in the following chart, government regulation will be imposed everywhere on of the lines touches a carrier.
- FCC responsibilities will be expanded enormously.
- A wide variety of CMRS providers will become regulated for the first time.
- Both long distance and other CMRS carriers will be able to require them to provide interconnection i.e., dedicated ports, lines and switching facilities), and some government agency will have to be the arbiter of "fair" prices.
- Incentives for innovative relationships, joint venture, and investment incentives between the various CMRS and long distance parties will be significantly reduced. All will have to treat all others the same way.

FULL CARRIER INTERCONNECTION REGULATION

The Proposed Law



Conclusion

- **No new interconnection requirements are necessary to permit new wireless networks to compete and grow.**

Technical Reference
TR-NPL-000275
Issue 1, April 1986

Notes on the BOC Intra-LATA Networks — 1986

TECHNICAL REFERENCE NOTICE

This Technical Reference is published by Bell Communications Research, Inc. (Bellcore) to inform the industry of Bellcore's view of the Bell Operating Company (BOC)* switched intra-LATA networks characteristics, including exchange access, as of 1-1-86.

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Readers are specifically advised that each BOC may have implemented its intra-LATA network differently from the network described herein. Therefore, readers should communicate directly with a BOC or regional affiliate thereof to ascertain that company's actual implementation.

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* Bell Operating Company or BOC means a divested Bell Operating Company.

1.0 General

DEFINITION OF TERMS

1.01 The following generic terms are used to describe various components of cellular systems. An illustrative cellular communications system interconnection configuration is shown in Figure 16-1.

- ***Cell site:*** A transmitter-receiver location, operated by the Cellular Mobile Carrier (CMC), through which radio links are established between the cellular system and mobile units. The area served by a cell site is referred to as a "cell."

- ***Cellular Geographic Service Area:*** The geographic area served by the cellular system within which a CMC is authorized to provide service.

- ***Mobile Telephone Switching Office (MTSO):*** The hub controller, operated by the cellular carrier, which exercises system control over a cellular communications system.

- ***Cellular system:*** A high-capacity land mobile radio system in which an assigned frequency spectrum is divided into discrete channels that are assigned in groups to cells covering the Cellular Geographic Service Area (CGSA). The discrete channels can be reused in different cells within the same service area. Calls are "handed off" automatically from a channel in one cell to a different channel in an adjacent cell as the mobile unit moves across cell boundaries within the CGSA.

- ***Cell site link:*** A circuit that interconnects an MTSO with a cell site. See TR-NPL-000145, *Compatibility Information for the Interface Between a Cellular Mobile Carrier and a Wireline Exchange Carrier.*

- ***Radio links:*** Radio frequency communication channels between cell site transmitter-receivers and mobile or portable units.

- ***Interconnection circuit:*** A circuit that interconnects a Bell Operating Company (BOC) switching office with a cellular MTSO.

BACKGROUND INFORMATION

1.02 The CMC defines the cellular geographic service area for a given cellular system in accordance with guidelines set forth in the Federal Communications Commission (FCC) CC Docket No. 79-318 Report and Order. The Cellular Geographic Service Area is divided into cells varying in size according to terrain, density of mobile subscribers, and anticipated traffic volumes.

1.03 Cellular communications systems employ technology which permits the reuse of radio frequencies within each Cellular Geographic Service Area. The assigned frequency spectrum is divided into discrete channels that are assigned in groups to cells covering the service area. The discrete channels can be reused in different non-adjacent cells within the service area. As a mobile unit moves across cell boundaries within the Cellular Geographic Service Area, an established call is transferred automatically from a channel in one cell to a different channel in an adjacent cell under the control of the MTSO.

1.04 Cellular technology promotes efficient use of the radio frequency spectrum and accommodates large numbers of mobile customers through frequency reuse. The ability to split cells and reassign channels permits cellular systems to adapt to increasing or changing subscriber and traffic densities.

1.05 The quality of service provided to cellular mobile customers is expected to be equivalent to that of telephone subscribers. The interconnection options described in part 2.0 and the circuit designs described in part 5.0 are provided to enable cellular carriers to configure their cellular communications systems to meet this quality of service objective.

DESCRIPTION OF BASIC CELLULAR SYSTEM CONFIGURATION

1.06 Figure 16-1 shows an illustrative cellular communications system interconnection configuration. In this basic cellular system, the mobile units interact with the cell site transmitter-receiver equipment via radio links. Cell sites connect to the MTSO via cell site links. The MTSO interconnects with one or more BOC switching offices

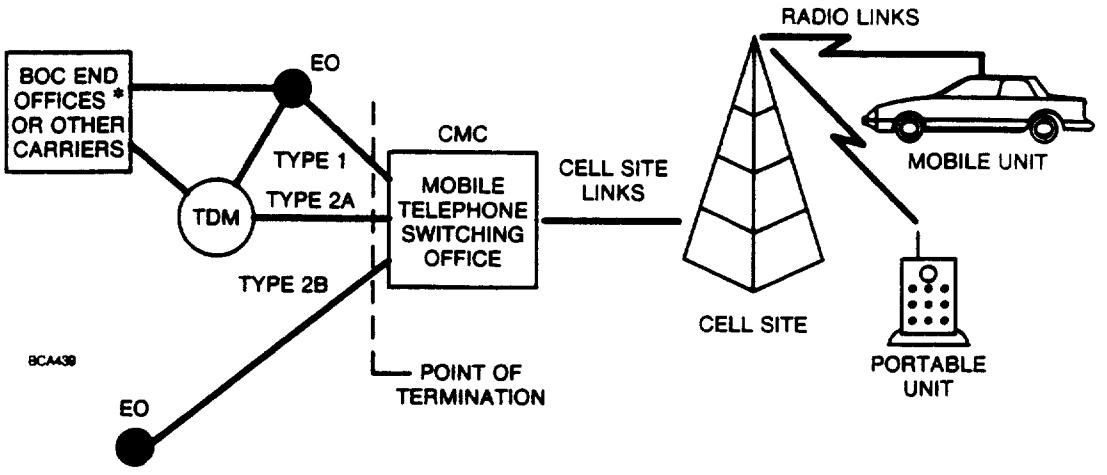

Figure 16-1. Cellular Mobile Carrier to Local Exchange Carrier Switched Interconnection Configurations (Type 1, Type 2A, and Type 2B)

* BOC end offices are covered under the Local Exchange Carrier (LEC) designation in the documents referenced in this section (e.g., TR-EOP-000352, "Cellular Mobile Carrier Interconnection Transmission Plans".

via interconnection circuits. These circuits have been classified as one of three interconnection options (Type 1, 2A or 2B) and are explained further in part 2.0.

2.0 Interconnection Types

DESCRIPTION

2.01 There are various switched interconnection alternatives available for the interconnection of a cellular mobile system with a BOC network. Three specific types of interconnections are identified in this section: connection through a BOC end office (Type 1), direct CMC connection with a BOC tandem office (Type 2A), and direct connection limited to a specific BOC end office (Type 2B). CMC connection to the BOC Local Access and Transport Areas (LATAs) and other carriers [e.g., another CMC, other exchange carriers, or Interexchange Carriers (ICs)] for Type 1 and Type 2A is provided through the BOC interface switch. The Type 2B option is used only for interconnection with NXXs served by a specific end office. The Type 2B interconnection may be used in conjunction with the Type 2A tandem interconnection on a high-usage alternate routing basis. The network configurations and interconnection designations for the three options are illustrated in Figure 16-1.

TYPE 1

2.02 The Type 1 interconnection is between the CMC-designated POT and a BOC end office switching system that enables a path to be established between the CMC's MTSO and the BOC end office. The CMC establishes connections to other end offices and other carriers through this interconnection.

TYPE 2A

2.03 The Type 2A interconnection is at the POT of a trunk between a cellular MTSO and a designated BOC tandem switching system. Through this option, the CMC can establish intra-LATA connections to BOC end offices connected to the tandem and to other carriers interconnected through the tandem. Type 2A interconnection may be used on an inter-LATA basis through proper arrangements with the ICs.

TYPE 2B

2.04 The Type 2B interconnection is at the POT of a trunk between a cellular MTSO and a BOC end office switching system. Through this option, the CMC establishes connections to NXXs served by the one end office to which it is interconnected. A Type 2B interconnection may be used in conjunction with the Type 2A on a high-usage alternate routing basis to serve high-volume traffic between the MTSO and the BOC end office.

3.0 Numbering, Dialing, and Routing Plans

3.01 Each mobile station served by a cellular MTSO is identified by a unique North American Numbering Plan destination address code (telephone number). Because cellular systems have the capability to accommodate large numbers of mobile stations, sizable quantities of telephone numbers are required. In large metropolitan cellular market areas, cellular carriers may require the equivalent of several complete central office (NXX) codes to provide each mobile station its own unique telephone number.

3.02 Cellular mobile carriers can design their systems so that the MTSO interfaces, via Type 1 interconnection circuits, with more than one end office. Cellular systems designed in this manner may require allocation of blocks of telephone numbers from each end office they interconnect with, rather than having all telephone numbers appear in just one central office code.

LAND LINE STATION TO MOBILE STATION CALLS

3.03 Calls from land line stations to mobile stations served by cellular systems are dialed and routed in the same manner as calls between land line stations. The land line calling party dials the mobile station's 7- or 10-digit telephone number without an access code unless there is a need to specify an IC for transport of the call. The BOC makes a call record when necessary for billing purposes.

3.04 Land line station to cellular system mobile station calls are routed over the BOC network to the BOC switching office, which interconnects with the MTSO. That office translates the digits received, seizes a circuit to the MTSO and, after receiving an appropriate start signal, outpulses a sufficient number of digits to identify the called mobile station.

3.05 The cellular MTSO signals the called mobile station upon receipt of digits from the telephone company office. The cellular MTSO will transmit an answer signal to the BOC switching office when the called mobile station goes off-hook (answers), and a disconnect signal when the mobile station goes on-hook (hangs up).

MOBILE STATION TO LAND LINE STATION CALLS

3.06 On calls from mobile stations served by cellular systems to land line stations, the cellular MTSO seizes an interconnection circuit to the designated BOC switching office and, after receiving a wink signal, outpulses the called land line station's 7- or 10-digit telephone number. The BOC makes a call record when necessary for billing purposes.

3.07 Intra-LATA calls handled by the BOC are routed over the BOC network to the end office where the called land line station's telephone number is assigned. That end office rings the called land line station. An answer signal is transmitted to the cellular MTSO when the called land line station goes off-hook, and a disconnect is transmitted when the land line station goes on-hook to terminate the call.

3.08 Calls which are to be routed via the BOC network to an IC may be indicated by the mobile station by dialing the proper carrier access code. For example, calls routed to an IC that has Feature Group A (FG A) switched access service may be indicated by dialing the appropriate 7- or 10-digit FG A code. Similarly, for FG B the appropriate 950-0XXX or 950-1XXX code is dialed by the mobile station.

3.09 For calls which are routed to an IC that has FG D, the proper 10XXX carrier access code is dialed. Then, depending on the interconnection type being employed (Type 1 or Type 2A), the cellular MTSO outpulses a carrier identification protocol such as 10XXX or OZZ-XXX, prior to outpulsing the called station's 7- or 10-digit telephone number. It should also be noted that with the Type 1 interconnection, the trunks can be presubscribed to a particular IC and calls routed to that IC do not require the outpulsing of 10XXX prior to the called station's telephone number.

4.0 Interfaces

GENERAL

4.01 TR-NPL-000145, *Compatibility Information for the Interface Between a Cellular Mobile Carrier and a Wireline Exchange Carrier*, provides detailed information on the network control signaling and supervision signals that must be exchanged between the cellular MTSO and the wire line telephone network.

TRANSMISSION INTERFACE

4.02 Figure 16-2 depicts schematically a typical interface for an interconnection

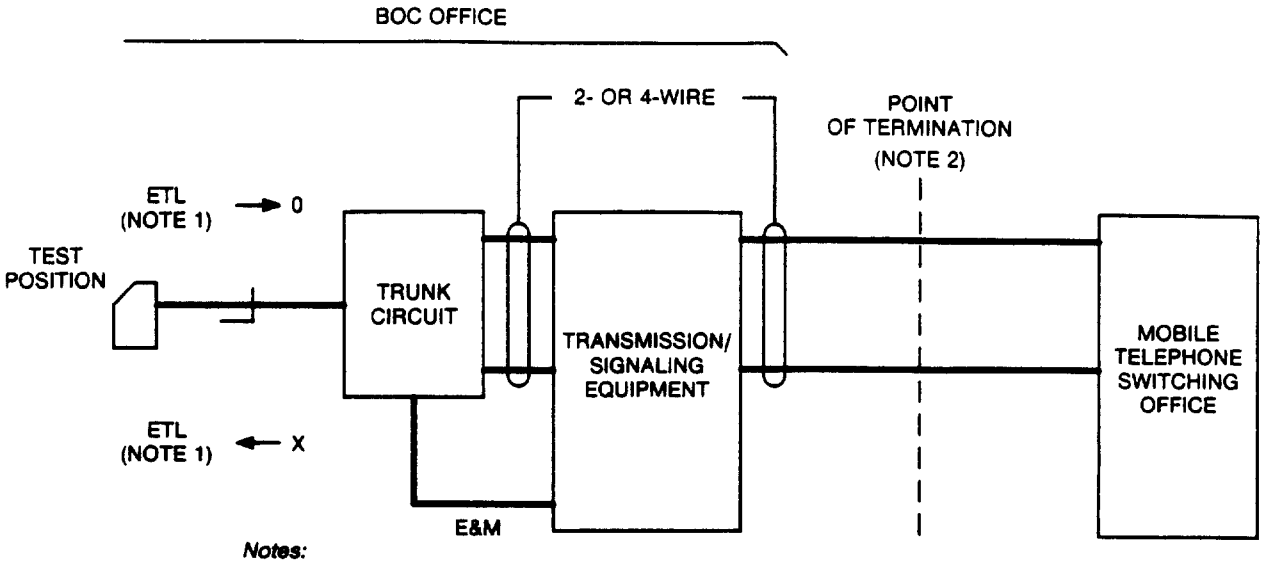

Figure 16-2. Typical Interconnection Circuit

circuit. This type of circuit provides a 2- or 4-wire transmission interface and can accommodate a wide range of transmission levels at the POT. Circuit designs for these interconnections and the cell site links are discussed in part 5.0.

DIGITAL INTERFACE

4.03 Many cellular mobile carriers use digital systems to perform the cellular MTSO and/or cell site functions. Direct connection of these digital switching systems to digital facilities may be technically and economically desirable to eliminate the need for digital-to-analog-to-digital conversion, and to allow digital transmission facilities to be used where most cost-effective.

4.04 Digital facilities may be used to interconnect cell sites with the cellular MTSO and/or the MTSO office with BOC offices where appropriate tariffs or contracts are available. Normally these facilities provide point-to-point 1.544 Mbps (DS1) full-duplex transmission of serial bipolar pulses, with constraints on signal format. The signals transmitted are described in TR-EOP-000054, *High Capacity Digital Service Channel Interface Specification.* In addition, DS1 facility characteristics are described in PUB 43801, *Digital Channel Bank Requirements and Objectives.*

4.05 Additional specifications regarding the DS1 interface can be found in Compatibility Bulletin CB 119, *Interconnection Specification for Digital Cross-Connects.*

4.06 Timing information for synchronization of a digital cellular switching office is needed whenever that office is connected to the land-line network via digital facilities. In such a case, the timing information can be transmitted isochronously over the DS1 line as part of the 1.544 Mbps signal, subject to the constraint that a given stratum level clock cannot derive timing from a lower-stratum level clock. If a digital MTSO is of a higher-stratum level than the BOC office to which it is connected, timing information for synchronization is derived from a separate digital connection to a network node of the appropriate stratum level. The cellular carrier is the source of timing information on DS1 lines between a digital cellular MTSO and digital cell sites. For further information, see Section 11.

4.07 The hierarchical clock synchronization methods and stratum levels are discussed in PUB 60110, *Digital Synchronization Network Plan.*